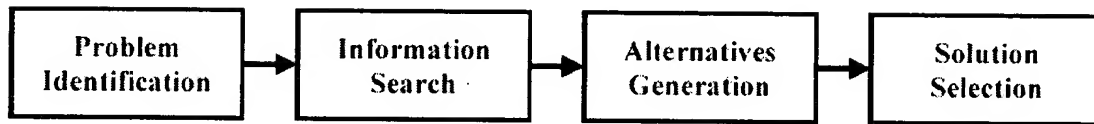


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**FIG. 1**

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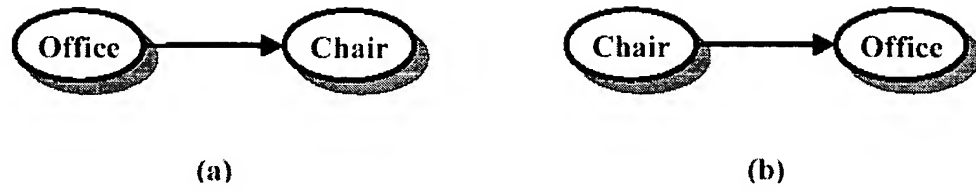


FIG. 2

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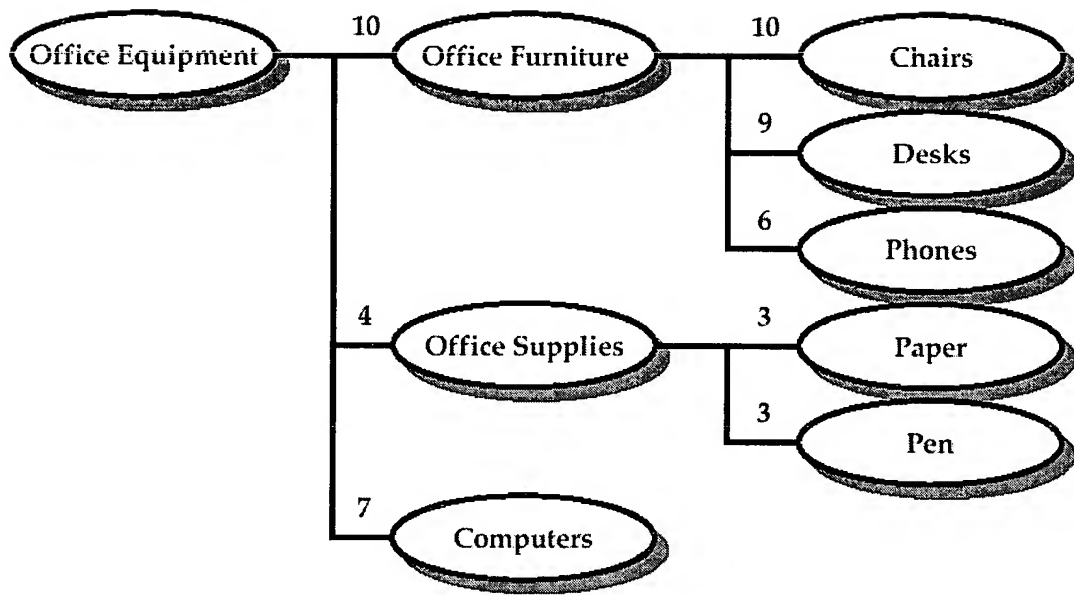


FIG. 3

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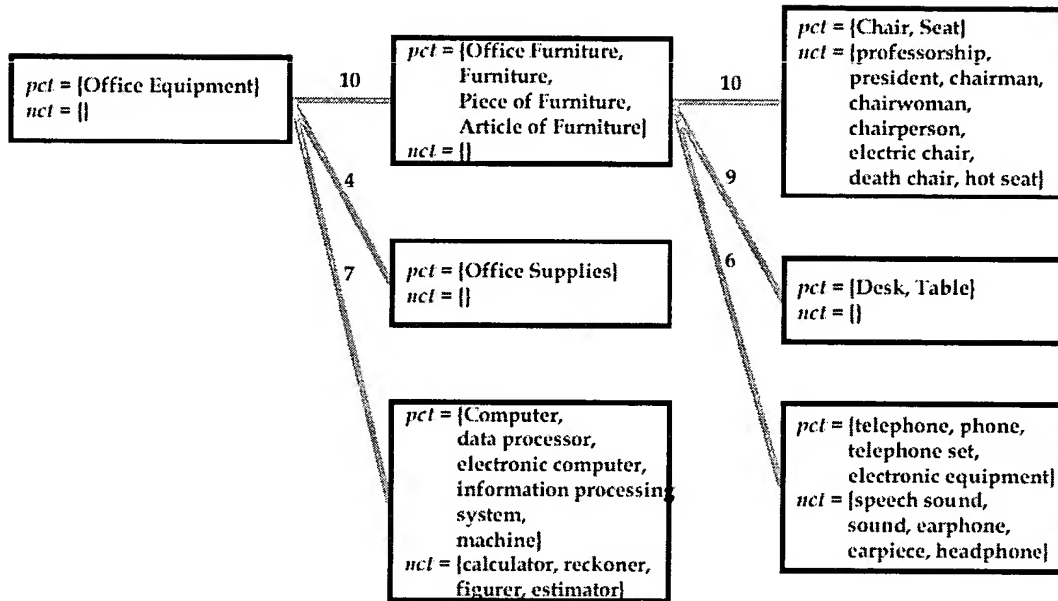


FIG. 4

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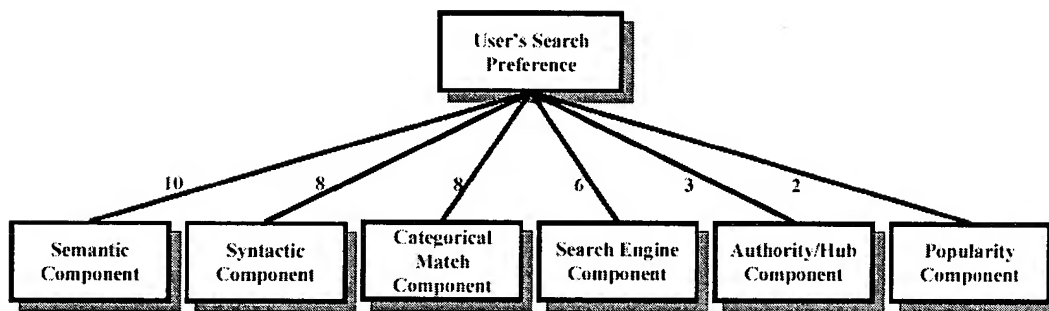


FIG. 5

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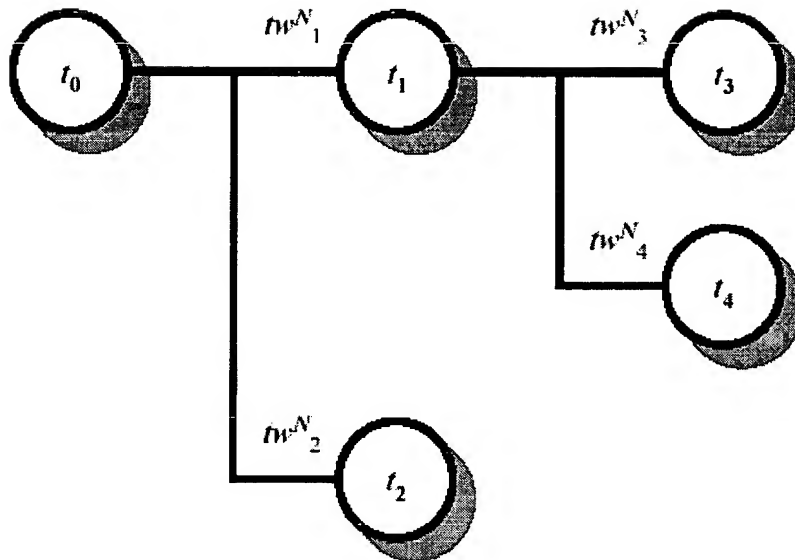


FIG. 6

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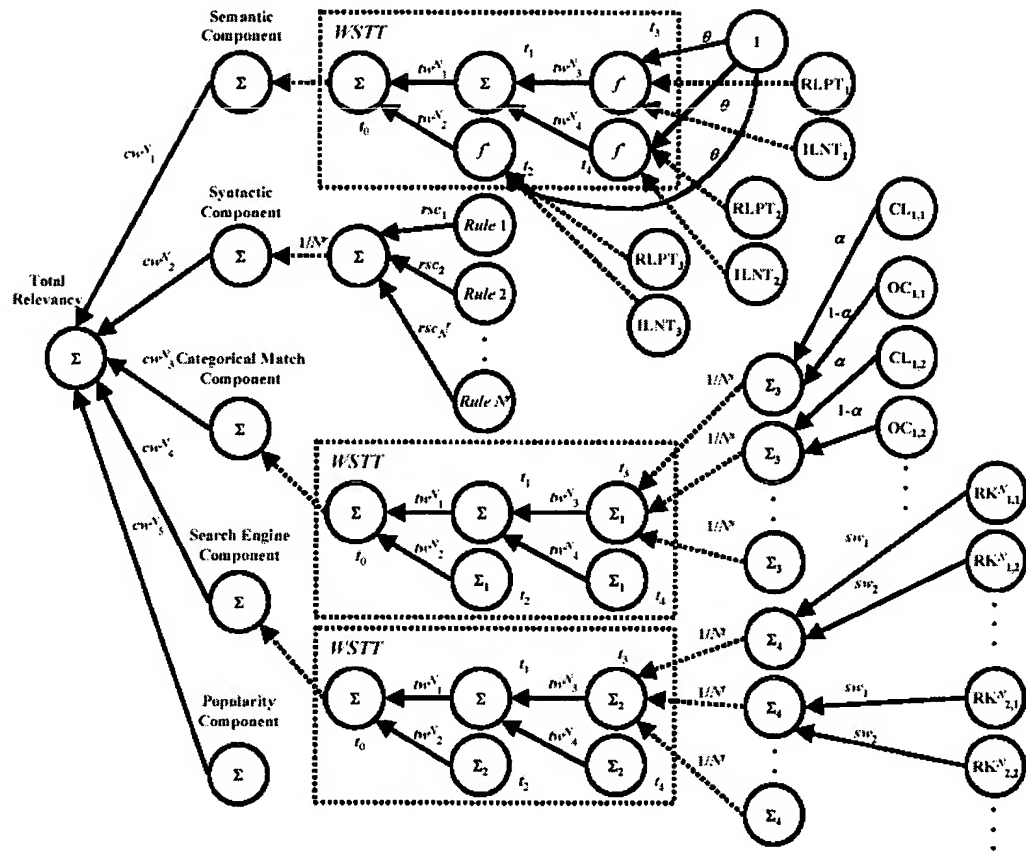


FIG. 7

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**User Profile Learning Algorithm**

**inputs:** *MAX\_EPOCHS*, *MIN\_ERROR*, *UserProfileModel*, *DocumentSet*, *UserFeedback*, *NWS*  
**local variables:** *epochs*, *currentError*, *documentError*, *node*, *weight*, *document*, *mwse*, *parameter*, *documentVector*, *relevancyLevel*

```

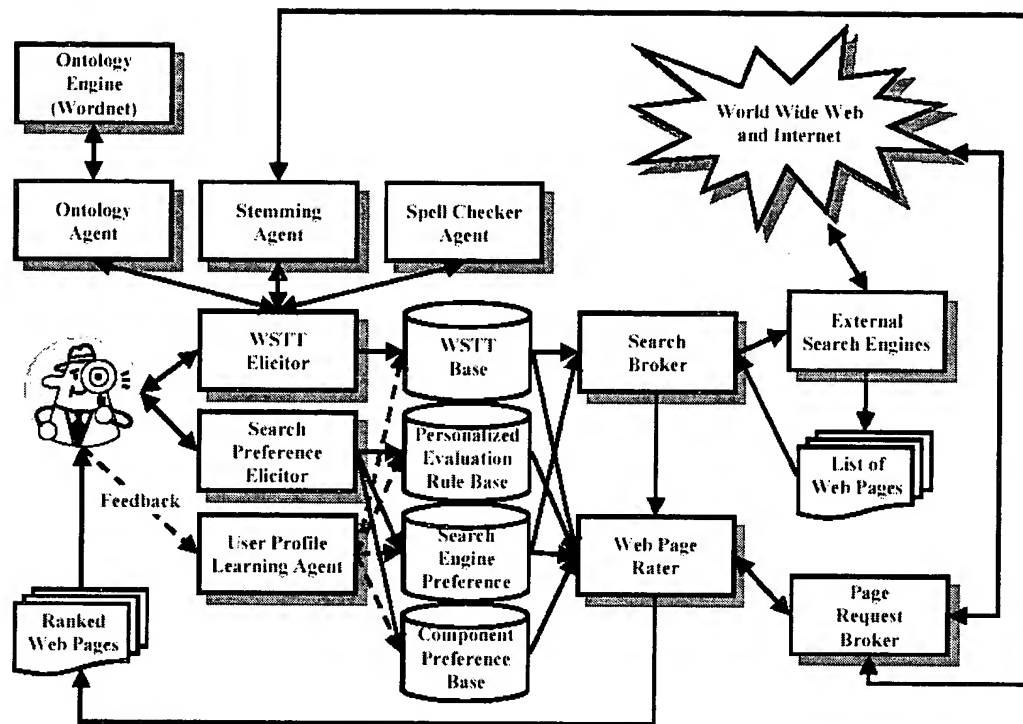
loop do
  if currentError < MIN_ERROR then return success
  else if epochs > MAX_EPOCHS then return success
  currentError ← 0.0
  for each document in DocumentSet do
    compute documentVector
    for each node in the leaf node set of UserProfileModel do
      bind node with the corresponding value of documentVector
    end
    propagate UserProfileModel
    using General Propagation Rule and Theta Propagation Rule
    obtain relevancyLevel at the root node of UserProfileModel
    compute documentError using Relevancy Error Computing Rule
    for each node in the node set of UserProfileModel do
      if node is not related to  $\theta$  then
        apply Generalized Delta Computing Rule to node
      else
        apply Delta for Theta Computing Rule to node
      end
    end
    for each weight in the weight set of UserProfileModel do
      if PS(weight) is not equal to  $\theta$  then
        apply Generalized Weight Updating Rule to weight
      else
        apply Theta Updating Rule to weight
      end
    end
    for each set of weights mwse in NWS do
      for each weight in mwse do
        apply Weight Normalization Rule to weight
      end
    end
    for each parameter in the parameter set of UserProfileModel do
      for each weight in PSWS(parameter) do
        apply Weight Synchronization Rule to weight
        if weight < 0 then weight ← 0
        else if weight > 1 then weight ← 1
      end
    end
    currentError ← currentError + documentError
  end
  epochs ← epochs + 1
end

```

FIG. 8



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**FIG. 9**

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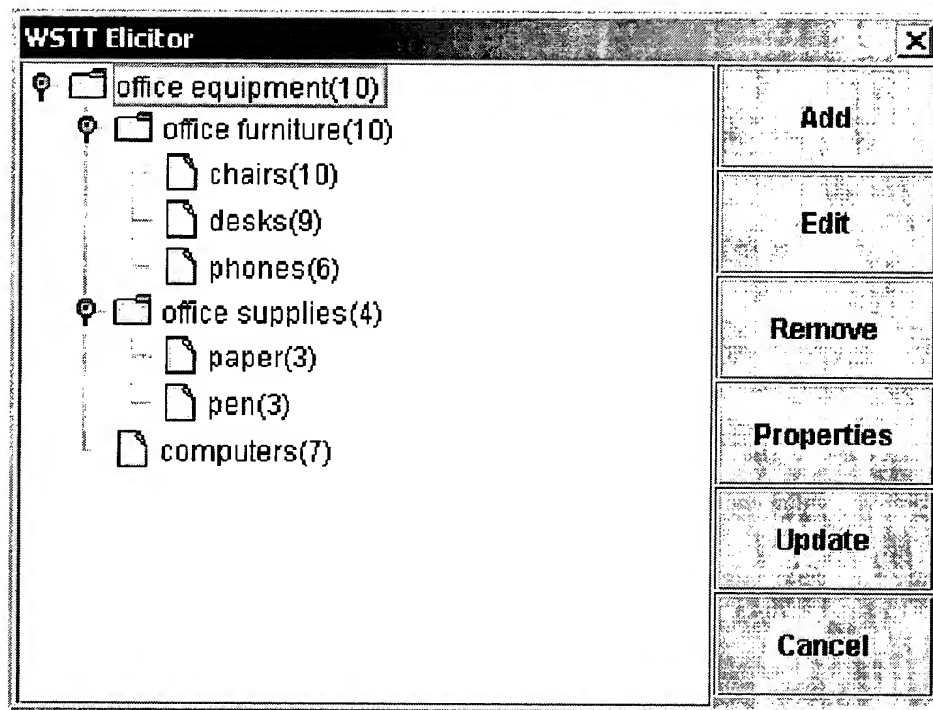


FIG. 10

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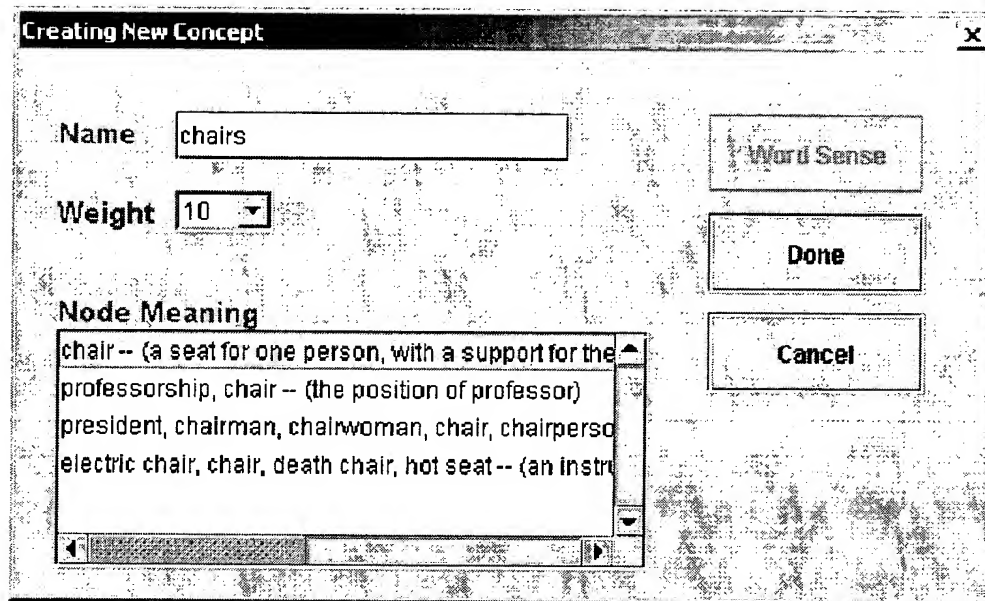
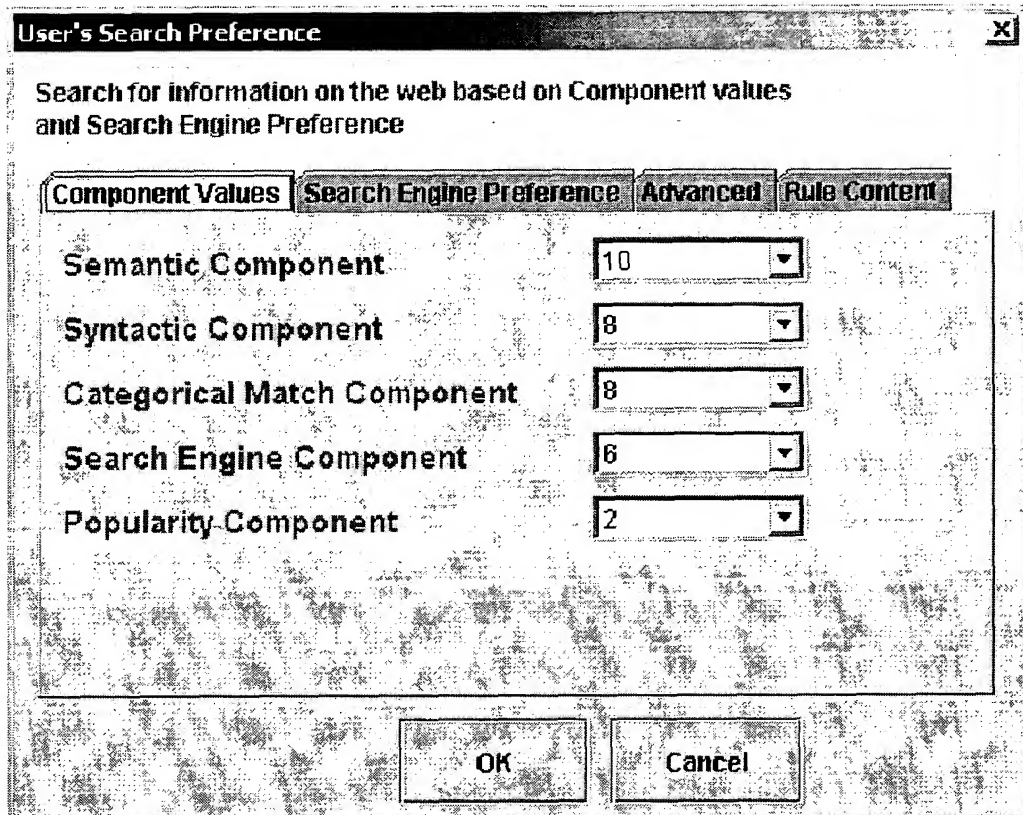


FIG. 11

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The image shows a screenshot of a software dialog box titled "User's Search Preference". The dialog box has a title bar with a close button (X). Below the title bar, there is a text area that reads: "Search for information on the web based on Component values and Search Engine Preference". Below this text area, there are four tabs: "Component Values", "Search Engine Preference", "Advanced", and "Rule Content". The "Component Values" tab is currently selected. Inside this tab, there are five rows, each with a label on the left and a numeric value in a dropdown menu on the right. The rows are: "Semantic Component" with value 10, "Syntactic Component" with value 8, "Categorical Match Component" with value 8, "Search Engine Component" with value 6, and "Popularity Component" with value 2. At the bottom of the dialog box, there are two buttons: "OK" and "Cancel".

Component	Value
Semantic Component	10
Syntactic Component	8
Categorical Match Component	8
Search Engine Component	6
Popularity Component	2

FIG. 12

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WebSilter Search Engine

Search Learn Help

Businessman Problem

- office equipment(10)
  - office furniture(10)
    - chair(10)
    - desk(9)
    - phone(6)
  - office supplies(4)
    - paper(3)
    - pen(3)
  - computer(7)

Evaluation	Rank	Title	Url	Semantic	Syntactic	Category	Search E...	Popularity	Total Re...
Relevant	1	Online Offic...	<a href="http://www.officesuppliesuperstore.com/">http://www.officesuppliesuperstore.com/</a>	0.286	1	0	0.034	0	0.325
Don't Know	2	Arwebb Offic...	<a href="http://www.arwebb.com/">http://www.arwebb.com/</a>	0.241	1	0	0.034	0	0.312
Don't Know	3	Lockdown C...	<a href="http://www.lockdowncomputer.com/">http://www.lockdowncomputer.com/</a>	0.2	1	0.014	0.017	0	0.3
Don't Know	4	Admin Syste...	<a href="http://www.adminsystems.co.uk/">http://www.adminsystems.co.uk/</a>	0.2	1	0	0.027	0	0.299
Don't Know	5	All Makes Of...	<a href="http://www.all-makes.com/">http://www.all-makes.com/</a>	0.2	1	0	0.017	0	0.297
Don't Know	6	discount offi...	<a href="http://www.discount-office-equipment.com/">http://www.discount-office-equipment.com/</a>	0.2	1	0	0.017	0	0.297
Don't Know	7	K. S. Office ...	<a href="http://www.ksoffice.com.au/">http://www.ksoffice.com.au/</a>	0.2	1	0	0.015	0	0.297
Don't Know	8	GOA Office ...	<a href="http://goa.asiaep.com/">http://goa.asiaep.com/</a>	0.2	1	0	0.015	0	0.297
Don't Know	9	Office Equip...	<a href="http://www.technology-leasing.co.uk/">http://www.technology-leasing.co.uk/</a>	0.2	1	0	0.013	0	0.296
Don't Know	10	Office Equip...	<a href="http://www.owensborooffice.com/">http://www.owensborooffice.com/</a>	0.2	1	0	0.013	0	0.296
Don't Know	11	EQUIPMEN...	<a href="http://www.finance-equipment.com/">http://www.finance-equipment.com/</a>	0.2	1	0	0.013	0	0.296
Don't Know	12	Bell Office E...	<a href="http://www.belloffice.com">http://www.belloffice.com</a>	0.2	1	0	0.012	0	0.296
Don't Know	13	Computer cl...	<a href="http://www.af-net.com/">http://www.af-net.com/</a>	0.2	1	0	0.012	0	0.296
Don't Know	14	Ohio Busine...	<a href="http://www.obmlnc.com/">http://www.obmlnc.com/</a>	0.2	1	0	0.01	0	0.296
Don't Know	15	Admin Syste...	<a href="http://adminsystems.co.uk/">http://adminsystems.co.uk/</a>	0.2	1	0	0.01	0	0.296
Don't Know	16	Computer tr...	<a href="http://www.symquest.com/">http://www.symquest.com/</a>	0.2	1	0	0.008	0	0.296
Irrelevant	17	Office Equip...	<a href="http://www.ghonline.net/">http://www.ghonline.net/</a>	0.2	1	0	0.007	0	0.295
Don't Know	18	J&R - T...	<a href="http://www.jandr.com/">http://www.jandr.com/</a>	0.2	1	0	0.005	0	0.295
Don't Know	19	J&R - T...	<a href="http://www.jandr.com/Templates/informat...">http://www.jandr.com/Templates/informat...</a>	0.2	1	0	0.003	0	0.295

FIG. 13

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Search Engines	Average Performance
WebSifter	63%
Copernic	40%
Altavista	43%
Google	40%
Yahoo	48%
Excite	43%

FIG. 14

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Rank	URL	Feedback	Relevancy
1	<a href="http://www.countryseat.com">http://www.countryseat.com</a>	Y	Y
2	<a href="http://www.infant-car-seat.com/">http://www.infant-car-seat.com/</a>	N	N
3	<a href="http://www.chairmaker.co.uk/">http://www.chairmaker.co.uk/</a>	Y	Y
4	<a href="http://www.convertible-car-seat.com/">http://www.convertible-car-seat.com/</a>	N	N
5	<a href="http://www.booster-car-seats.com/">http://www.booster-car-seats.com/</a>	N	N
6	<a href="http://www.booster-seats-online.com/">http://www.booster-seats-online.com/</a>	Don't Know	N
7	<a href="http://www.booster-car-seat.com/">http://www.booster-car-seat.com/</a>	Don't Know	N
8	<a href="http://www.podiatrychair.com/">http://www.podiatrychair.com/</a>	Don't Know	N
9	<a href="http://www.carolinachair.com/">http://www.carolinachair.com/</a>	Don't Know	Y
10	<a href="http://www.chairdancing.com/">http://www.chairdancing.com/</a>	Don't Know	N
11	<a href="http://www.massage-chairs-online.com/">http://www.massage-chairs-online.com/</a>	Don't Know	N
12	<a href="http://www.panasonic-massage-">http://www.panasonic-massage-</a>	Don't Know	N
13	<a href="http://www.fairfieldchair.com/">http://www.fairfieldchair.com/</a>	Don't Know	Y
14	<a href="http://www.gasserchair.com/">http://www.gasserchair.com/</a>	Don't Know	Y
15	<a href="http://www.chairtech.com/">http://www.chairtech.com/</a>	Don't Know	Y
16	<a href="http://www.snugseat.com/">http://www.snugseat.com/</a>	Don't Know	N
17	<a href="http://www.seat.com/">http://www.seat.com/</a>	Don't Know	N
18	<a href="http://www.fifthchair.org/">http://www.fifthchair.org/</a>	Don't Know	N
19	<a href="http://www.painted-">http://www.painted-</a>	Don't Know	N
20	<a href="http://www.jeanmonnetprogram.org/">http://www.jeanmonnetprogram.org/</a>	Don't Know	N

FIG. 15

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Rank	URL	Relevancy
1	<a href="http://www.fairfieldchair.com/">http://www.fairfieldchair.com/</a>	Y
2	<a href="http://www.chairmaker.co.uk/">http://www.chairmaker.co.uk/</a>	Y
3	<a href="http://www.carolinachair.com/">http://www.carolinachair.com/</a>	Y
4	<a href="http://www.podiatrychair.com/">http://www.podiatrychair.com/</a>	N
5	<a href="http://www.chairdancing.com/">http://www.chairdancing.com/</a>	N
6	<a href="http://www.gasserchair.com/">http://www.gasserchair.com/</a>	Y
7	<a href="http://www.chairtech.com/">http://www.chairtech.com/</a>	Y
8	<a href="http://www.snugseat.com/">http://www.snugseat.com/</a>	N
9	<a href="http://www.fifthchair.org/">http://www.fifthchair.org/</a>	N
10	<a href="http://www.ompchairs.com/">http://www.ompchairs.com/</a>	Y
11	<a href="http://www.cyberchair.com/">http://www.cyberchair.com/</a>	Y
12	<a href="http://www.massage-chairs-online.com/">http://www.massage-chairs-online.com/</a>	N
13	<a href="http://www.panasonic-massage-">http://www.panasonic-massage-</a>	N
14	<a href="http://www.jeanmonnetprogram.org/">http://www.jeanmonnetprogram.org/</a>	N
15	<a href="http://www.leap-chair.com/">http://www.leap-chair.com/</a>	Y
16	<a href="http://www.painted-">http://www.painted-</a>	N
17	<a href="http://www.zackback.com/">http://www.zackback.com/</a>	Y
18	<a href="http://www.chair-ergonomics.com/">http://www.chair-ergonomics.com/</a>	Y
19	<a href="http://www.countryseat.com">http://www.countryseat.com</a>	Y
20	<a href="http://www.infant-car-seat.com/">http://www.infant-car-seat.com/</a>	N

FIG. 16



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Search Term	Before Learning	After Learning	Performance Enhancement
chair	30%	55%	25%
paper	45%	60%	15%
pen	55%	85%	30%
rock	15%	75%	60%
phone	65%	80%	15%
Average	42%	71%	29%

FIG. 17